

$D_1(2420)^\pm$
 $I(J^P) = \frac{1}{2}(?)$
 / needs confirmation.

OMITTED FROM SUMMARY TABLE

Seen in $D^*(2007)^0\pi^+$. $J^P = 0^+$ ruled out.

NODE=M120

NODE=M120

NODE=M120M

NODE=M120M

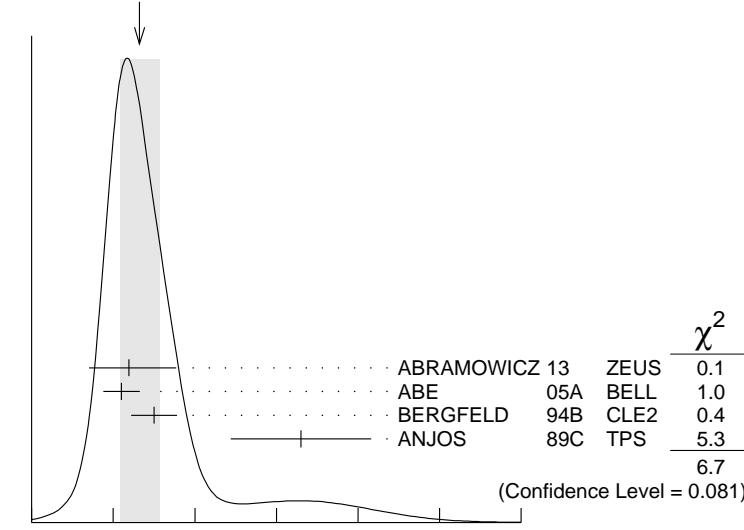
NEW

NODE=M120M;LINKAGE=AB

 $D_1(2420)^\pm$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
2423.2±2.4 OUR AVERAGE	Error includes scale factor of 1.5. See the ideogram below. [2423.4 ± 3.1 MeV OUR 2012 AVERAGE Scale factor = 1.8]			
2421.9±4.7 ^{+3.4} _{-1.2}	759	1 ABRAMOWICZ13	ZEUS	$e^\pm p \rightarrow D(*)^0\pi^+ X$
2421 ± 2 ± 1	124	ABE	05A BELL	$\bar{B}^0 \rightarrow D^+\pi^+\pi^-\pi^-$
2425 ± 2 ± 2	146	BERGFELD	94B CLE2	$e^+ e^- \rightarrow D^{*0}\pi^+ X$
2443 ± 7 ± 5	190	ANJOS	89C TPS	$\gamma N \rightarrow D^0\pi^+ X^0$

¹ From the fit of the $M(D^0\pi^+)$ distribution. The widths of the D_1^+ and D_2^{*+} are fixed to 25 MeV and 37 MeV, and A_{D_1} and A_{D_2} are fixed to the theoretical predictions of 3 and -1, respectively.

 WEIGHTED AVERAGE
 2423.2±2.4 (Error scaled by 1.5)
 **$D_1(2420)^\pm$ MASS (MeV)**

$m_{D_1^*(2420)^\pm} = m_{D_1^*(2420)^0}$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
4⁺²₋₃±3	BERGFELD	94B CLE2	$e^+ e^- \rightarrow \text{hadrons}$

NODE=M120DM

NODE=M120DM

NODE=M120W

NODE=M120W

 $D_1(2420)^\pm$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
25± 6 OUR AVERAGE				
21± 5±8	124	ABE	05A BELL	$\bar{B}^0 \rightarrow D^+\pi^+\pi^-\pi^-$
26 ^{+ 8} ₋₇ ±4	146	BERGFELD	94B CLE2	$e^+ e^- \rightarrow D^{*0}\pi^+ X$
41±19±8	190	ANJOS	89C TPS	$\gamma N \rightarrow D^0\pi^+ X^0$

$D_1(2420)^{\pm}$ DECAY MODES

$D_1^*(2420)^-$ modes are charge conjugates of modes below.

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 D^*(2007)^0 \pi^+$	seen
$\Gamma_2 D^+ \pi^+ \pi^-$	seen
$\Gamma_3 D^+ \rho^0$	
$\Gamma_4 D^+ f_0(500)$	
$\Gamma_5 D_0^*(2400)^0 \pi^+$	
$\Gamma_6 D^0 \pi^+$	not seen
$\Gamma_7 D^{*+} \pi^+ \pi^-$	not seen

$D_1(2420)^{\pm}$ BRANCHING RATIOS

$\Gamma(D^*(2007)^0 \pi^+)/\Gamma_{\text{total}}$	Γ_1/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
seen	ANJOS 89C TPS $\gamma N \rightarrow D^0 \pi^+ X^0$
<hr/>	
$\Gamma(D^0 \pi^+)/\Gamma(D^*(2007)^0 \pi^+)$	Γ_6/Γ_1
<u>VALUE</u> <u>CL%</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •	
<0.18 90	BERGFELD 94B CLE2 $e^+ e^- \rightarrow \text{hadrons}$
<hr/>	

$D_1(2420)^{\pm}$ POLARIZATION AMPLITUDE A_{D_1}

A polarization amplitude A_{D_1} is a parameter that depends on the initial polarization of the D_1 and is sensitive to a possible S -wave contribution to its decay. For D_1 decays the helicity angle, θ_h , distribution varies like $1 + A_{D_1} \cos^2 \theta_h$, where θ_h is the angle in the D^* rest frame between the two pions emitted by the $D_1 \rightarrow D^* \pi$ and the $D^* \rightarrow D \pi$.

Unpolarized D_1 decaying purely via D -wave is predicted to give $A_{D_1} = 3$.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<hr/>			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
3.8 ± 0.6 ± 0.8	² AUBERT	09Y BABR	$B^0 \rightarrow D_1^- \ell^+ \nu_\ell$
<hr/>			
2 Assuming $\Gamma(\Upsilon(4S) \rightarrow B^+ B^-) / \Gamma(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = 1.065 \pm 0.026$ and equal partial widths and helicity angle distributions for charged and neutral D_1 mesons.			

$D_1(2420)^{\pm}$ REFERENCES

ABRAMOWICZ 13	NP B866 229	H. Abramowicz <i>et al.</i>	(ZEUS Collab.)
AUBERT 09Y	PRL 103 051803	B. Aubert <i>et al.</i>	(BABAR Collab.)
ABE 05A	PRL 94 221805	K. Abe <i>et al.</i>	(BELLE Collab.)
BERGFELD 94B	PL B340 194	T. Bergfeld <i>et al.</i>	(CLEO Collab.)
ANJOS 89C	PRL 62 1717	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)

NODE=M120215;NODE=M120

NODE=M120

DESIG=1

DESIG=3;OUR EST; \rightarrow UNCHECKED \leftarrow

DESIG=4

DESIG=5

DESIG=6

DESIG=2;OUR EVAL; \rightarrow UNCHECKED \leftarrow

DESIG=7;OUR EST; \rightarrow UNCHECKED \leftarrow

NODE=M120220

NODE=M120R1

NODE=M120R1

NODE=M120R2

NODE=M120R2

NODE=M120PAH

NODE=M120PAH

NODE=M120PAH

NODE=M120PAH;LINKAGE=AU

NODE=M120

REFID=54743

REFID=52929

REFID=50755

REFID=44099

REFID=40737